# Adverse Effects of Arsenic Exposure on Motor Function among Children in Bangladesh

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**ABSTRACT**

**Background and Aims:** Several reports indicate that drinking water arsenic (WAs) and manganese (WMn) areassociated with children's intellectual function. Very little is known, however, about possible associations with other neurological outcomes such as motor function.
**Methods:** We investigated the associations of WAs and WMn with motor function in 304 children in Bangladesh, aged 8-11 years. In addition to water, we measured arsenic and manganese concentrations in blood, urine and toenails. We assessed motor function with the Bruininks-Oseretsky Test (BOT-2), which can be summarized with a total score of overall motor proficiency (TMC) or in four subscales: fine manual control (FMC), manual coordination (MC), body coordination (BC) and strength and agility (SA).
**Results:** Log transformed blood As (BAs) was associated with decreases in TMC (ß=-3.65, p<0.01), FMC (ß=-1.70, p<0.05) and BC (ß= -1.61, p<0.01), with adjustment for gender, school attendance, head circumference, mother's intelligence, plasma ferritin, blood Mn, Pb, and Se. Other measures of As exposure (water As, urinary As, and toenail As) demonstrated similar associations. We also have observed a strong positive association between square transformed blood selenium (BSe) and motor function, another novel finding. A significant association between BSe and TMC (ß=3.54, p<0.005), FMC (ß=1.55, p<0.005) and MC (ß=1.57, p<0.005) was found in the unadjusted models; the relationship between BSe and MC remained significant in the full model. Mn exposure was not associated with motor function.
**Conclusion:** Our research demonstrates an adverse association of As exposure and a protective association of Se on motor function in children.

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